Abdominosacral Approach for Retrorectal Tumors

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The relative rarity and anatomical position of retrorectal tumors may lead to difficulty in diagnosis and surgical treatment. The clinical features and management of 20 such tumors (chordoma 8, neurilemmoma 3, teratoma 3, hemangiopericytoma 1, chondrosarcoma 1, osteosarcoma 1, dermoid 1, lipoma 1, and undifferentiated sarcoma 1) have therefore been reviewed. Low back or sacral pain was present in 18 patients and, although all tumors were palpable on rectal examination, pain had been present for a median of 12 months before diagnosis. Mean tumor size was 9.4 cm (range: 2.5–17 cm). Sacral bone destruction was demonstrated radiographically in all chordomas and three sarcomas, but in none of the benign tumors. Three patients had undergone previous partial removal of their tumors. Surgical resection was carried out using a combined abdominal and transsacral approach in 13, a transsacral approach in the right lateral position in four and transabdominally in three. There was one operative death following secondary operation for chordoma. Four of 12 patients with malignant tumors are alive and well at seven months to eight years. One died of a myocardial infarct without recurrence at 11 years. For small benign tumors, the right lateral position permits maximal flexibility for resection either by the transsacral, transabdominal or a combined approach. For bulky or malignant tumors, a combined abdominal transsacral approach in the right lateral position permits vascular control and provides good exposure for protection of vital structures and wide resection.

THE RELATIVE RARITY and anatomical position of retrorectal tumors may lead to difficulty in diagnosis and surgical treatment. Retrorectal tumors may arise from embryologic rests, normal soft tissues or bone and they may be benign or malignant. Reported results of treatment of malignant lesions have been poor. Indeed, some authors have concluded that chordoma is nearly impossible to extirpate and invariably recurs.[2,6] Early experience with the management of sacral chordomas[4] has led to the development of a combined abdominal and transsacral approach to retrorectal tumors and the authors' experience with these tumors over the past 15 years has therefore been reviewed.

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Patient Population

From 1964 to 1979 20 patients underwent operation for retrorectal tumors. There were ten men and ten women ranging in age from 16 to 68 years (median: 45). The histologic diagnoses were chordoma 8, neurilemmoma 3, teratoma 3, hemangiopericytoma 1, osteogenic sarcoma 1, chondrosarcoma 1, undifferentiated sarcoma 1, dermoid 1, and lipoma 1. Three patients (chordoma 2, chondrosarcoma 1) had undergone previous partial resection of their tumors.

Clinical Features

Chordomas were diagnosed in seven men (age: 45–68, median: 64) and one woman (age: 45.) Other lesions occurred more frequently in women and at a younger age (16–62, median: 31) (Table 1).

Low back or sacral pain was present in 18 patients and had been present for a median of 12 months (2 days to 8 years) before diagnosis (Table 2). Constipation and ridging or narrowing of the stools was noted in six patients and urinary frequency or dysuria was present in three. Involvement of nerve roots was manifested by radicular pain in nine patients, sensory or motor deficits in seven and urinary and fecal incontinence in two. Radicular pain was present in six of 12 patients with malignant tumors, but was also a feature of three out of eight benign tumors. Similarly, sensory or motor deficits were a feature of both malignant (five of 12) and benign (two of eight) disease. However, both patients with urinary and fecal incontinence had advanced malignant tumors.

A history of possible infection was elicited in two of three patients with teratomas. One patient had undergone previous drainage of a pelvic abscess which was probably an infected teratoma. The second patient presented initially with spiking fever and malaise and was found to have a ruptured teratoma.

Mean tumor size was 9.4 cm (range: 2.5–17 cm) and

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TABLE 1. *Retrorectal Tumors (1964–1979)*

Diagnosis	No. of Patients	Sex and Age
Malignant		
chordoma	8	7 men, 1 woman
primary 6		age 45–68 years
recurrent 2		(median: 61.5)
sarcoma	4	2 men, 2 women
hemangiopericytoma 1		age 19–58 years
osteogenic sarcoma 1		(median: 40.5)
recurrent chondrosarcoma 1		
undifferentiated sarcoma 1		
Benign		
neurilemmoma 3	8	2 men, 6 women
teratoma 3		age 16–62 years
dermoid 1		(median: 31)
lipoma 1		

all were palpable as extramucosal lesions. The tumor was fixed to bone in all primary sacral malignant tumors, but five of the benign soft tissue tumors were also immovable. Chordomas were smooth rubbery tumors lying in the midline. Two were lobulated and one had a posterior parasacral component. Other tumors were often asymmetric. Some teratomas or neurilemmomas were cystic or spongy in consistency, but they could not consistently be distinguished from chordoma by palpation.

Diagnostic Studies

Sigmoidoscopy, intravenous pyelogram and barium enema were either normal or demonstrated only extrinsic compression by the tumor. Plain x-rays and sacral tomograms revealed bone destruction in all chordomas and primary sacral sarcomas (Fig. 1). No bony change was demonstrated in the patient with the hemangiopericytoma nor in any of the benign tumors. Angiography was negative or revealed only an avascular mass in all tumors except the hemangiopericytoma which appeared as a hypervascular mass supplied by the left hypogastric artery.

Computerized axial tomography has been helpful in five recent cases in delineating the extent of tumor.

Operative Approach

Before 1967, four malignant tumors were managed by a two phase operation. With the patient in the supine position, an abdominal incision was made and the rectum was mobilized away from the anterior surface of the tumor. The patient was then turned into the prone position and sacral resection was carried out by a posterior incision. After 1967, seven malignant tumors and two benign tumors were resected by a synchronous abdominal and transsacral approach in the lateral position. Three tumors (hemangiopericytoma, lipoma, neurilemmoma) have been resected by the transabdominal approach in the supine position. In two of these three cases the tumors (lipoma, neurilemmoma) were found by gynecologic surgeons and resection was completed by the transabdominal route. Four benign tumors have been resected by the transsacral approach with the patient in the right lateral position.

Abdominosacral Resection

The patient is placed in the lateral position illustrated in Figure 2. This position allows a combined abdominal and transsacral approach when required. In addition, for small benign tumors, this position allows flexibility for excision by a transabdominal, transsacral or combined approach.

TABLE 2. *Findings in 20 Patients with Retrorectal Tumors*

	All 20 Tumors		12 Malignant		8 Benign	
	No. Patients	Per Cent	No. Patients	Per Cent	No. Patients	Per Cent
Symptoms						
low back pain	18	90	11	92	7	88
change in stool	6	30	3	25	3	38
radicular pain	9	45	6	50	3	38
"infection"	2	10	0	0	2	25
fecal and urinary incontinence	2	10	2	17	0	0
Signs						
palpable tumor	20	100	12	100	8	100
fixed tumor	16	80	11	92	5	63
sensory or motor deficit	7	35	5	42	2	25
X-ray						
bone destruction	11	55	11	92	0	0

Median duration of symptoms: 12 months (2 days to 8 years).

For malignant tumors involving bone a combined approach has been used consistently over the past 11 years. The abdomen is entered through an oblique incision starting between the left iliac crest and costal margin (Fig. 2A) and running parallel to the inguinal ligament. The left colon and rectum are mobilized and displaced anteriorly and to the patients right. The upper limit of the tumor is identified. The left ureter is identified. Tapes are placed around the iliac vessels for temporary occlusion (Fig. 2). The dissection of the rectum from the tumor is continued to the level of the levator ani. The middle sacral vessels and lateral sacral veins, more prominent than usual, are suture ligated. A transverse incision is made over the sacrum posteriorly and skin flaps are developed. (Fig. 2B) The gluteal muscles are detached from their sacral origins. The anococcygeal ligament is incised and the presacral space entered to join the abdominal dissection. The iliac vessels are occluded by traction on the tapes. The sacrotuberous, sacrospinous and lower sacroiliac ligaments are divided. The pyriformis muscles are detached. The sacroiliac articulations are divided at the level determined by abdominal dissection and the sacrum is transsected. No attempt is made to preserve sacral roots below the level of transection. The specimen is removed and the wound is closed with suction drainage.

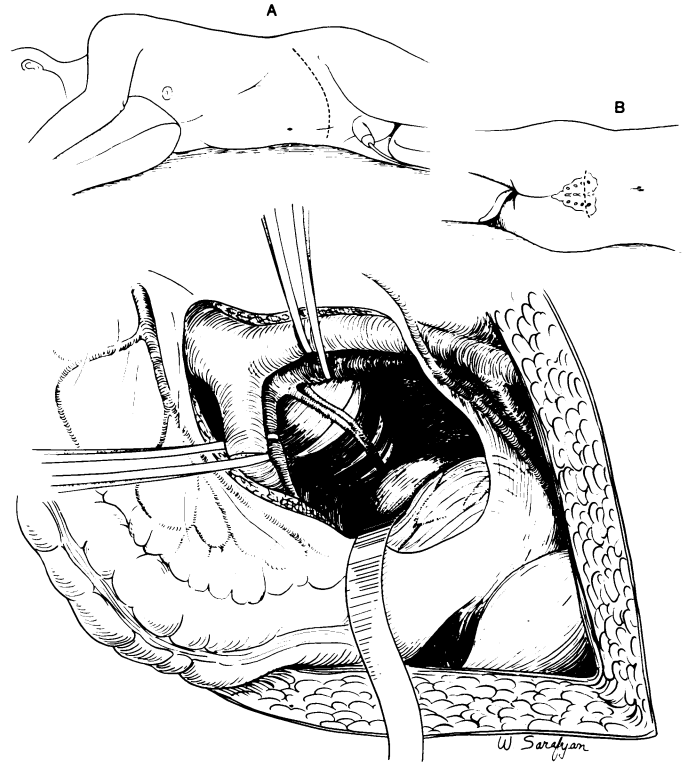

FIG. 2. Transabdominal mobilization of the rectum from the chordoma and tapes encircling the iliac vessels for vascular control. (A) Position and abdominal incision. (B) Posterior incision for sacral resection.

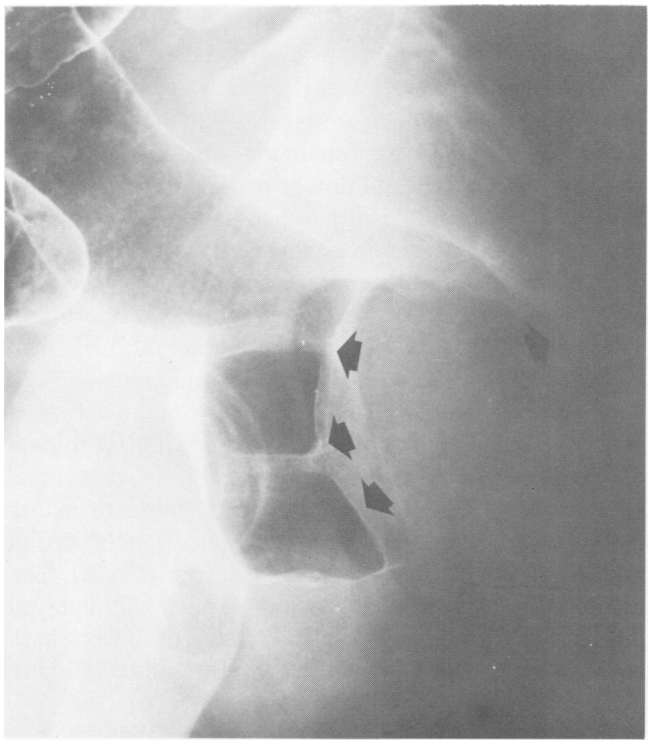

FIG. 1. Barium air contrast x-ray study showing anterior displacement of the rectum and destruction of the sacrum by chordoma.

Operative Morbidity and Mortality

There was one operative death (5%). This patient had undergone several previous operations for a sacral chordoma. Following two phase abdominosacral resection of his tumor, he developed severe urinary and wound sepsis and died on the eighteenth postoperative day.

The first three patients in this series with chordomas underwent sacral resection by the two phase abdominosacral approach. Operative blood loss in these patients was large—averaging 5000 ml (range: 3000–8500 ml). Five subsequent patients underwent resection of sacral chordomas by the synchronous abdominosacral approach in the right lateral position with control of the iliac vessels. With this approach, substantial bleeding may still occur during sacral transection. However, operative blood loss was reduced to 400–1500 ml (mean: 1100 ml) in four of these five patients. In the fifth patient, resection of a large chordoma which involved the iliac veins led to an operative blood loss of 7000 ml.

Urinary retention in the immediate postoperative period occurred in five patients, and in two men with chordomas transurethral prostatectomy was necessary. Patients with resection at the mid S2 vertebra or lower had essentially normal urinary sphincter function.

TABLE 3. *Late Results in Patients with Malignant Tumors*

Diagnosis	Year	Status	Follow-up	Comments
Chordoma	1964	Died of myocardial infarction	11 years	No evidence of recurrence
Chordoma	1965	Alive with disease	14 years	Recurrence at five years—radiotherapy
Chordoma	1971	Alive and well	8 years	
Chordoma	1972	Alive and well	7 years	Repair of posterior hernia—no recurrence
Chordoma	1979	Alive and well	7 months	
Recurrent chordoma	1966	Postoperative death	—	
Recurrent chordoma	1974	Alive with disease	4 years	Palliative, radiotherapy
Chordoma	1977	Alive with disease	2 years	Palliative, radiotherapy, chemotherapy
Undifferentiated sarcoma	1966	Dead of disease	3 months	Widespread dissemination
Osteogenic sarcoma	1968	Dead of disease	6 years	Reoperation, radiotherapy
Recurrent chondrosarcoma	1977	Alive—clinical remission	2 years	Radiotherapy, chemotherapy
Hemangiopericytoma	1977	Alive and well	2 years	

In resections at the S1–S2 interspace with sacrifice of S2 roots, patients commonly developed neurogenic bladder. However, these patients have awareness of bladder distention and are able to initiate voiding by contraction of the abdominal muscles. Only one patient developed urinary incontinence postoperatively. This patient had benign prostatic hypertropy and a hypotonic bladder preoperatively which required transurethral prostatic resection postoperatively for urinary retention.

Anal continence has been preserved in all patients but did not return in the two patients who were incontinent preoperatively.

Saddle anesthesia occurs with sacrifice of lower sacral roots.

In two recent patients, one with chordoma and one with lipoma, motor weakness of the lower extremity has occurred. Neurologic evaluation including electromyography suggest stretch injury to the motor nerves and both patients are ambulatory with a cane.

In no case has there been instability of the sacroiliac joint.

Survival

The fate of all patients with malignant tumors is summarized in Table 3. Five patients underwent primary curative resections for chordoma. One patient had recurrence of tumor at five years. Secondary removal was unsuccessful, but the patient is alive with disease following radiation therapy at 14 years. One patient died 11 years postoperatively of a myocardial infarction with no evidence of recurrent disease. The remaining three patients are alive and free of disease at seven months, seven years and eight years respectively. Two patients with palliative operations are alive at two and four years respectively.

Treatment of primary sacral sarcomas has not been as successful as chordomas. The patients with undifferentiated sarcoma and osteogenic sarcoma died of disease at three months and six years respectively. The patient with recurrent chondrosarcoma is alive in apparent remission two years following incomplete resection, radiation therapy and chemotherapy. The patient with hemangiopericytoma is alive and well at two years.

Eight patients with benign tumors have had excellent results with no recurrences or permanent disability with a follow-up of up to 11 years.

Discussion

Retrorectal tumors are uncommon lesions in adult patients. They are usually slow growing tumors which produce symptoms by pressure on pelvic viscera and nerves. Symptoms are characteristically present for many months or years and tumors generally attain considerable size despite the fact that they are readily palpable by digital examination of the rectum. In most series the congenital group, chordoma, teratoma and dermoids form the largest group of retrorectal tumors.[1,3,6] In addition osseous tumors of the sacrum and soft tissue tumors of the retrorectal space are reported.

Preliminary differentiation of malignant from benign tumors should not be difficult and precise diagnosis may be made by incisional biopsy. External extension of tumor can be biopsied preoperatively or tissue may be obtained for frozen section diagnosis at operation. Transrectal biopsy should not be employed for fear of dissemination of tumor. Symptoms and signs such as root pain, neurologic deficits, urinary or bowel complaints, and apparent bony fixation do not discriminate between benign or malignant tumors. Urinary or fecal incontinence in our experience does indicate malignancy. The single most reliable indication of malignancy is bone destruction of the sacrum (Fig. 1). The availability of computerized tomography should permit more accurate preoperative assessment of the extent of tumor, but even this modality may underestimate cephalad intraosseous extension.

In our experience operation in the lateral position by the synchronous abdominosacral approach provides maximum flexibility and wide resection of malignant tumors in this inaccessable area. The abdominal ex-

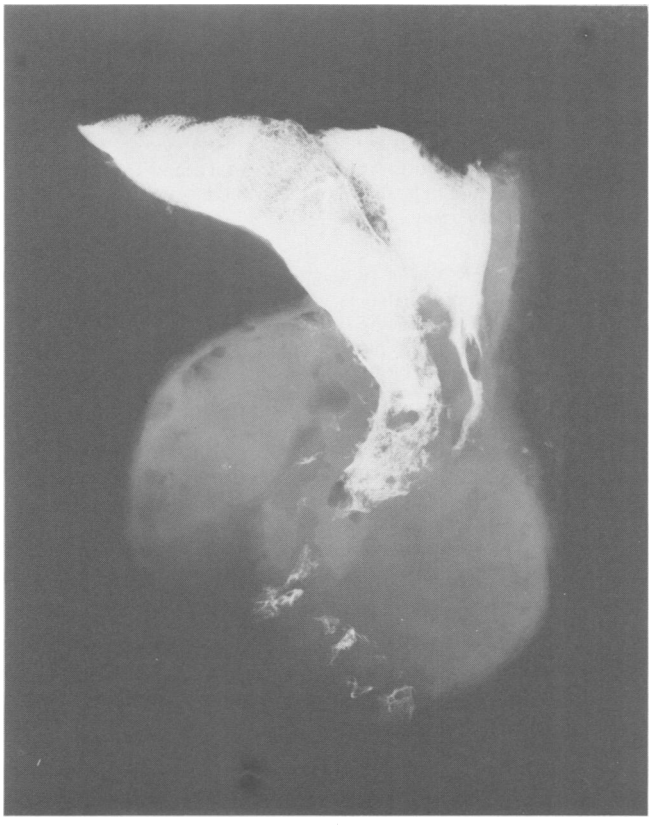

FIG. 3. X-ray study of the resected chordoma showing a wide margin of sacrum and widening, destruction and trabeculation of bone.

posure allows protection of rectum, ureters and major blood vessels. Temporary occlusion of the iliac vessels limits blood loss during the sacral resection.

Previous authors have focused on methods for preserving function by sparing specific nerve roots and many hold the view that chordoma almost invariably recurs locally.[2,5,6] The opening of sacral foramina and dissection of nerve roots violates principles of tumor isolation and invites spillage of tumor and local recurrence. In a recent comprehensive review of 222 patients with sacrococcygeal chordoma Gray et al. noted that average survival was 5.7 years.[2] Only 11 patients lived for ten years or longer and only two of these remained free of disease.

Our approach has been to resect, when possible, one vertebra above the proximal radiologic extent of tumor without regard for preserving sacral roots (Fig. 3). Although urinary dysfunction does occur, this problem is not insurmountable. Resection as high as the S1–S2 interspace with sacrifice of S2 nerve roots is compatible with osseous stability and urinary and fecal continence and is preferable to incomplete resection. Of five patients undergoing primary curative resection of chordoma three are alive and well seven months, seven years and eight years following operation and a fourth died at 11 years of a myocardial infarction without recurrence.

Benign retrorectal tumors are also conveniently treated in the lateral position, by an abdominal, transsacral or synchronous approach depending on size and location of the tumor. Benign tumors up to 8 cm in diameter have been excised by a posterior approach with removal of only coccyx or lower sacrum.

Teratoma and dermoids are subject to infection, rupture and malignant change. These tumors often attain considerable size and previous inflammation makes dissection difficult and hazardous. Incomplete removal invites recurrence. The abdominosacral approach provides maximum safety and ease of dissection.

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DISCUSSION

DR. ROBERT P. MCBURNEY (Memphis, Tennessee): I can't comment on the usefulness of the lateral synchronous combined procedure, because, as the saying goes, if you haven't tried it, don't knock it, and I've never tried it; but I can imagine that for me it might present some problems, working deep in the pelvis with the patient placed on his side.

My primary reason for discussing this is to show an unusual patient that had one of these retrorectal tumors.

(slide) This was a 27-year-old man that I first saw a number of years ago, with a history that he had noted a swelling on the sacral area which had been present for about five years, gradually increasing in size. He paid no attention to it until he bagan having increasing constipation, and this posteroanterior x-ray of the pelvis shows you a large calcified mass in the pelvis.

(slide) This x-ray does not show too well the actual margins of the tumor, but you can see that the entire pelvis is filled with calcification, with no air shadows, or anything, and at the sacral area, you see that it is occupied primarily by tumor.

(slide) This is a schematic drawing of the procedure that we used. I prefer the face-down, or Kraske, position for these tumors, and that's the type of procedure that was done on this patient. It was a huge tumor, and the insert shows you the projection into the pelvis, with a sort of an iceberg form. The incision is down the middle, with the gluteus maximus muscles being retracted. Every attempt should be made to leave at least one side of the S-2 nerve, to try to avoid neurogenic bladder, but if that cannot be preserved, of course, removing the tumor is the primary concern.

(slide) The tumor was so large that we weren't able to remove it in one piece. We had to morcellate it, because it could not be removed between the sacral spines. The tumor was entirely removed—at